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GB 2186724 A EP 0225298 A

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(54) Cordless iron

(57) A cordless iron having means for discontinuing the supply of power to the heating element when the temperature is approaching or has reached an upper limit of a range corresponding with a temperature setting, is provided with means for indicating that the iron should be returned to the base unit when its temperature is approaching, or has reached a predetermined lower limit. The indicating means is independently powered from a source within the iron, e.g. a battery. The indicating means responds to either the control means when the temperature of the iron has fallen to a lower limit at which said control means would normally supply power to the heating element, or the iron includes temperature sensing means, such as a thermister, for providing an output to cause the indicating means to indicate that the iron should be returned to the base unit.

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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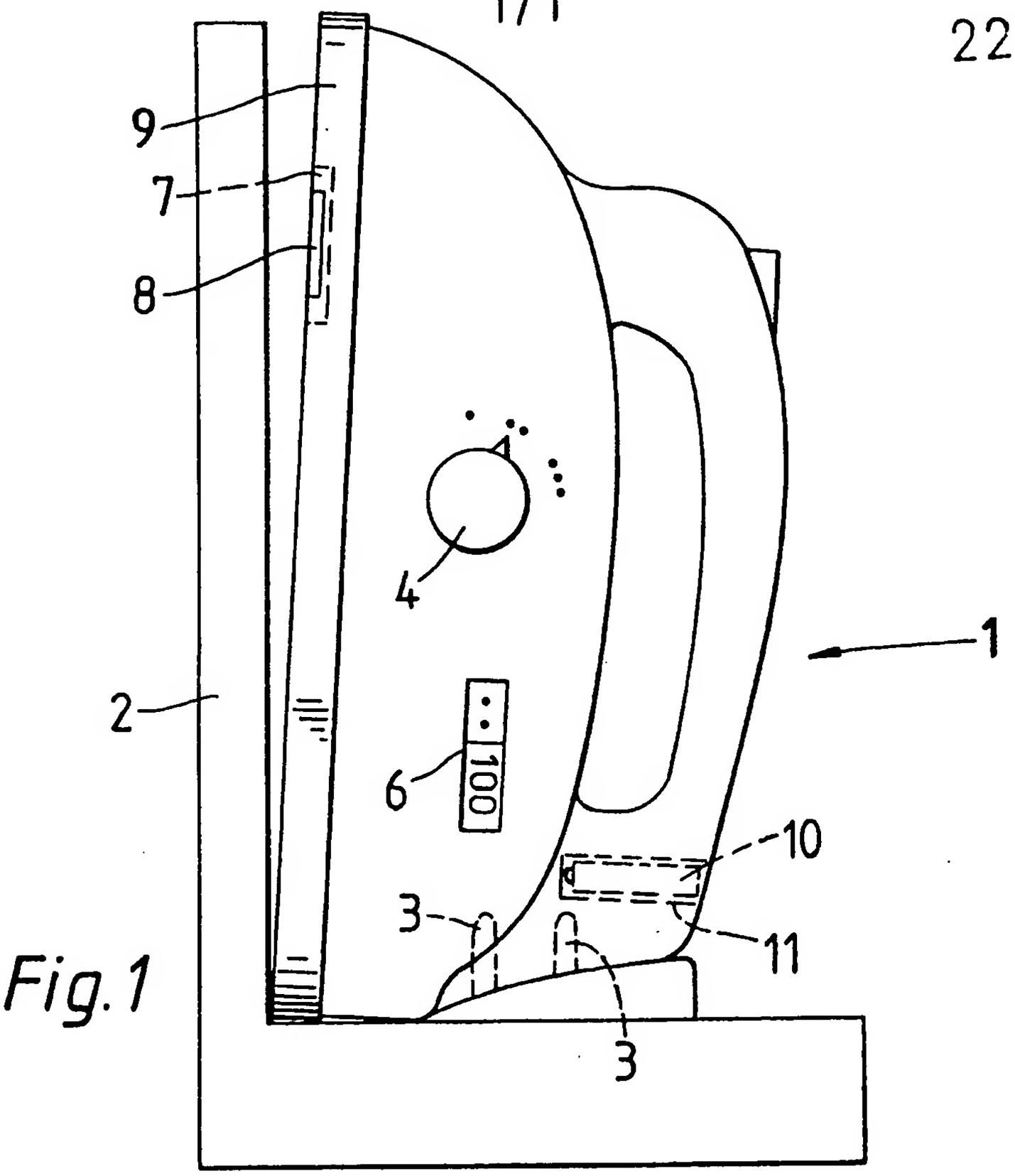

Fig.1

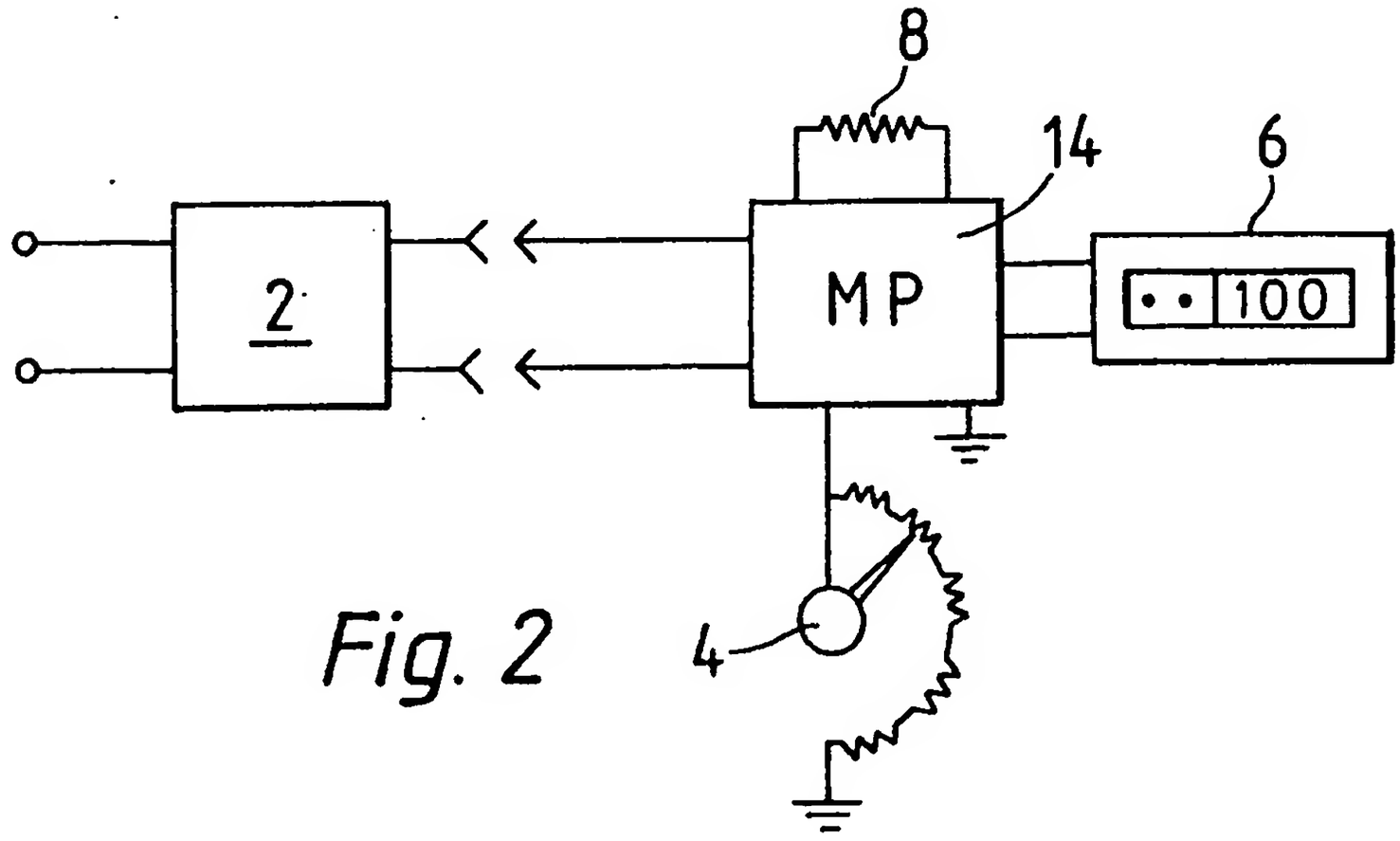

Fig. 2

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CORDLESS IRON

This invention relates to a cordless iron usable in either a charging state, in which it is electrically connected to a base unit in order to receive power, or in a cordless state, in which it is electrically disconnected from the base unit to facilitate ironing. The iron is provided with a connector for removable connection to the base unit. It is also provided with a heating element, means for selecting at least one temperature setting and control means for discontinuing the supply of power to the heating element when the temperature is approaching or has reached an upper limit of a range corresponding with the temperature setting.

When such an iron is connected to its base unit, its temperature will normally cycle through a given range in accordance with its temperature control. The upper limit of the range is conventionally signalled by the extinction of a light and the user then knows that the iron has reached a maximum temperature, for the particular setting, before starting to iron. However, when the iron is used in its cordless state, it is disconnected from the power supply and the user has no means of knowing whether or not its temperature is sufficient for ironing. This problem is aggravated by the fact that the iron will cool at different rates depending on the ambient temperature and the way in which it is used.

The present invention solves this problem by providing the iron with means for indicating that the iron should be returned to the base unit when its temperature is approaching, or has reached a predetermined lower limit, said indicating means being independently powered from a source within the iron.

The lower limit may be the lower limit of the control range corresponding with the selected temperature setting whereby the control means itself can provide a signal or a switching function in order to operate the indicating display means. Alternatively, the lower limit is independent of the control range and this can be achieved by providing a temperature sensor, within the iron, which provides an output for causing the indicating means to indicate when the iron should be returned to its base unit. For example, the temperature sensor may be located in the soleplate of the iron, preferably with means to protected against shock and vibration without affecting its thermal response. A suitable sensor is a thermister. A particular advantage of using temperature sensing is that it would be more reliable than using a timed interval for causing the indicating means to signal that the iron should be returned to its base unit.

Preferably, the indicating means indicates the thermal status and/or temperature selected as well as providing an indication that the iron should be returned to its base unit. For example, the indicating means may be an LCD screen mounted on the iron. Such a screen may be powered by a battery within the iron which may also serves to operate part of the circuitry for driving the display. Such a battery provides an independent power source when the iron has been removed from its base unit.

The indicating means may include a visual and/or audible warning that the iron should be returned to the base unit.

An embodiment of the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 illustrates a cordless iron in accordance with the invention, and

Figure 2 is a schematic circuit diagram.

Referring to Fig. 1, a cordless iron 1 is shown resting on a base unit 2 which is connected to a power supply (not shown). Connector means 3 normally supplies power to the iron 1 from the base unit 2 when the iron is resting, in an upright position, on the base unit. A temperature selector 4, mounted on the body 5 of the iron, may be adjusted to select (e.g.) any one of five temperature settings. The first three of the settings are represented by a single dot, a double dot and triple dot and the remaining settings are represented by the words "STEAM" and "MAX". An LCD display screen 6 is also mounted on the body of the iron and this screen serves two purposes:

(a) It displays the thermal status and selected temperature of the iron, and

(b) it provides a visual warning to return the iron back to the base unit 2 when used in its cordless state.

The visual warning (b) above may be in the form of a flashing display, e.g., either flashing the temperature indication or providing some other kind of flashing light. This may be supplemented by a sound warning, e.g., by means of a small sound transducer (not shown) located, for example, on the surface of the body 5 of the iron.

A thermister 7 is located in a small pocket 8 in the soleplate 9 of the iron to provide an output signal to control circuitry described with reference to Fig. 2. The thermister 7 may be encapsulated in a thermally conductive material which provides shock resistance and environmental protection.

A battery 10 is located in a battery compartment 11 in order to provide power to operate the LCD display 6 when the iron is used in its cordless state.

Referring to Fig. 2, various features of the iron 1 are identified by the same reference numerals in the schematic circuit diagram. Fig. 2 also illustrates control means 14 which is in the form of a printed circuit board containing circuitry for controlling the temperature of the iron in accordance with the selected setting (4). For example, the circuitry includes a microprocessor which receives respective inputs from thermister 8 and temperature selector 4 and which has outputs connected to a drive for the LCD display 6 and to a thyristor (not shown) for controlling the supply of power to a heating element (not shown) within the iron. The microprocessor is programmed to respond to the desired temperature setting (4) and to provide trigger signals e.g. for phase or burst firing control of the thyristor so as to regulate the power supplied to the heating element. The microprocessor is also programmed to cause the temperature setting (4) to be indicated on the left-hand side of the display 6 (e.g. the double dot is illustrated) and to cause the temperature of the soleplate, as sensed by thermister 8, to be indicated on the right-hand side of the display, (e.g. 100°C is illustrated). It is further programmed to cause the temperature indication to flash,

on-and-off, when the temperature of the iron has fallen to a value at which continued ironing would be difficult and the iron needs to be returned to the base unit 2 for "recharging" (i.e. reconnection to the power supply until the maximum control point of the selectd temperature setting has been reached).

Instead of using thyristor control, the iron may be fitted with a conventional bimetallic switch for controlling its temperature, i.e. when the iron is connected to the base unit 2. In this case, the microprocessor, or some simpler form of triggerable multivibrator, causes the temperature setting display to flash when the temperature of the iron (in its cordless mode) has fallen to the lower control point of the selected bimetallic control range. In this case, a temperature sensor such as thermistor 8, and the temperature indication, is not essential.

CLAIMS

1. A cordless iron useable in either a charging state, in which it is electrically connected to a base unit in order to receive power, or in a cordless state, in which it is electrically disconnected from the base unit to facilitate ironing, the iron comprising connector means for removably connecting said iron to the base unit, a heating element connected to said connector means, means for selecting at least one temperature setting, and means for discontinuing the supply of power to the heating element when the temperature is approaching or has reached an upper limit of a range corresponding with the temperature setting, characterised in that said iron provided with means for indicating that the iron should be returned to the base unit when its temperature is approaching, or has reached a predetermined lower limit, said indicating means being independently powered from a source within the iron.

2. A cordless iron according to claim 1 wherein said indicating means responds to said control means when the temperature of the iron has fallen to a lower limit at which said control means would normally supply power to the heating element when the iron is used in its charging state.

3. A cordless iron according to claim 1 and further including temperature sensing means for providing an output to cause said indicating means to indicate that the iron should be returned to the base unit.

4. A cordless iron according to claim 3 wherein the temperature sensing means is a thermister located in the soleplate of the iron.

5. A cordless iron according to any of the preceding claims and further including a battery compartment for receiving a battery to power said indicating means when the iron is used in its cordless state.

6. A cordless iron according to any of the preceding claims in which said indicating means indicates the thermal status and temperature setting of the iron besides providing an indication as to when the iron should be returned to the base unit.

7. A cordless iron according to claim 6 wherein said indicating means is an LCD display.

8. A cordless iron according to any of the preceding claims wherein the indicating means is either in the form of, or supplemented by means of producing a sound signal.

9. A cordless iron substantially as herein described with reference to the accompanying drawings.

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